

Claims:

1. A method for removing one or more selected gas components from a gas stream which comprises: bringing the gas stream into contact with a liquid including a solvent or a reagent for a selected component in a first turbulent contactor; subjecting the gas stream and the liquid to turbulent mixing conditions in the contactor thereby causing a selected gas component to be absorbed by a respective solvent or reagent in the liquid; passing the fluid mixture into a second turbulent contactor; and subjecting the fluid mixture to further turbulent mixing conditions in the second contactor, thereby causing further absorption of the same selected gas component, or absorption of another selected gas component, by a respective solvent or reagent; the method being a continuous process with the gas stream and liquid flowing co-currently, and at least one of the turbulent contactors comprising a vessel having a gas inlet, a liquid inlet, an outlet leading to a venturi passage, and a tube extending from the outlet back into the vessel.
2. A method as claimed in Claim 1, in which the tube is perforated and/or is spaced from the periphery of the outlet.
3. A method as claimed in Claim 1 ~~or Claim 2~~, in which the gas mixture is supplied to the tube and the liquid is supplied to the vessel, whereby the gas mixture draws the liquid into the venturi and the two phases are mixed.
4. A method as claimed in Claim 1 ~~or Claim 2~~, in which the gas mixture is supplied to the vessel and the liquid is supplied to the tube, whereby the gas is drawn into the venturi by the liquid and the two phases are mixed.
5. A method as claimed in Claim 1 ~~or Claim 2~~, in which the liquid and the gas mixture are supplied to the vessel, the liquid being supplied to a level above the level of the outlet, whereby the gas is forced out through the outlet via the tube, thereby drawing the liquid into the venturi so that the two phases are mixed.

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6. A method as claimed in Claim 1, in which the first turbulent mixing is conducted in a jet pump.

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7. A method as claimed in ^{Claim 1} ~~any preceding claim~~, in which the second contactor is located in a pipe extending from the venturi section of the first contactor.

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8. A method as claimed in ^{Claim 1} ~~any preceding claim~~, in which the fluid mixture is separated into a gas phase and a liquid phase between the two contactors, the phase separation preferably occurring in an annular flow generator.

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9. A method as claimed in ^{Claim 1} ~~any preceding claim~~, in which fresh liquid solvent is added to the second turbulent contactor.

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10. A method as claimed in ^{Claim 1} ~~any preceding claim~~, further comprising: cooling the mixture after the second turbulent mixing; separating the cooled mixture into a gas phase and a liquid phase; removing the gas phase; subjecting the solvent in the liquid phase to a regeneration treatment to remove the absorbed selected gas component; and recycling the regenerated solvent-containing liquid phase to the mixture.

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11. A method as claimed in Claim 10, in which the regeneration is carried out by heating and/or by flashing off the absorbed gas component in a flash tank.

12. A method as claimed in Claim 11, in which the post-mixing cooling and the regenerative heating are achieved, at least in part by mutual heat exchange.

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13. A method as claimed in ^{Claim 1} ~~any preceding claim~~, in which the liquid is pumped to the first turbulent contactor and thereby draws the gas mixture with it through the contactor.

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14. A method as claimed in ^{Claim 1} ~~any of Claims 1 to 12~~, in which the gas stream is conveyed to the first turbulent contactor at a high pressure and thereby draws the liquid

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with it through the contactor.

15. Apparatus for carrying out the method of Claim 10, comprising: a first turbulent contactor having a liquid inlet, a gas inlet and a fluid outlet; a second turbulent contactor having at least one fluid inlet and a fluid outlet, at least one of the turbulent contactors comprising a vessel having a gas inlet, a liquid inlet, an outlet leading to a venturi passage, and a tube extending from the outlet back into the vessel; a cooler for the fluid stream from the fluid outlet of the second turbulent contactor; a hydrocyclone or a gravity vessel arranged to separate the cooled fluid stream into a gas phase and a liquid stream; a regenerator arranged to treat the separated liquid stream; and a recycle line arranged to convey the regenerated liquid stream to either the first or second contactor or to a reservoir tank.

16. Apparatus as claimed in Claim 15, including an annular flow generator between the two contactors.

17. Apparatus as claimed in Claim 15 ~~or Claim 16~~, including a pump arranged to supply liquid to the liquid inlet of the first contactor.

18. Apparatus as claimed in ~~any of Claims 15 to 17~~, in which the regenerator is a heater and/or a flash tank.

19. Apparatus as claimed in ~~any one of Claims 15 to 18~~, in which the tube is perforated and/or is spaced from the periphery of the outlet.

20. Apparatus as claimed in ~~any of Claims 15 to 19~~, in which the first turbulent contactor is a jet pump.

21. Apparatus as claimed in ~~any one of Claims 15 to 20~~, in which the second turbulent contactor is located in a pipe extending from the venturi section of the first contactor.

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22. The use of more than one turbulent contactor for selectively absorbing one or more gas components from a gas stream, in which the gas stream is brought into contact with a liquid including solvents or reagents for the selected gas components, the absorption rate of reaction for the selected gas components being different thereby causing the selected components to be absorbed separately, at least one of the turbulent contactors comprising a gas inlet, a liquid inlet, an outlet leading to a venturi passage and a tube extending from the outlet back upstream.

23. A use as claimed in Claim 22, in which a first selected component is absorbed in a first contactor and a second selected component is absorbed in a second contactor.

24. A use as claimed in Claim 22 ~~or Claim 23~~; in which the gas stream is at high pressure and the first absorption is instantaneous.

25. A use as claimed in *Claim 22* ~~any one of Claims 22 to 24~~, in which the tube is perforated and/or is spaced from the periphery of the outlet.

26. A use as claimed in *Claim 22* ~~any one of Claims 22 to 25~~, in which the first contactor is a jet pump.

27. A use as claimed in *Claim 22* ~~any one of Claims 22 to 26~~, in which the second turbulent contactor is located in a pipe extending from the venturi section of the first contactor.

28. A use as claimed in *Claim 22* ~~any one of Claims 22 to 27~~, in which a gas phase and a liquid phase are separated after exit from a first turbulent contactor before entry into a second turbulent contactor, the phase separation preferably occurring in an annular flow generator.

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